ER-2 breakout session

1. In situ versus remote sensing measurement objectives
   a) Stair step (down to 39-43 kft)
   b) Level legs
   c) Other needs and desires (e.g. polarimeter, SSFR)
2. Desire close coordination with DC8 (radiation, retrieval evaluation, etc.)
3. Desire coordinate with
   a) satellite sensors
   b) ground sites (e.g. AERONET)
4. eMAS may be able to add low gain 3.7 μm for fire detction
5. Desire knowlegde of when first science flight at Palmdale in order to firm up schedule for integration and check and test flights
6. Desire knowledge regarding date of transition from Palmdale to Houston
7. Desire to have chat channel on MTS for communication with instrument Pis
8. Data transmission to ground- should be several datasets from remote and in situ sensors
9. Plan to have discussion among flight scientists and pilots, etc. to work out flight planning needs and flexbility in changing flight plans
10. Discussion of construction and interaction of flight plans

Types of ER-2 flight modules

1. **UTLS profiling** (above ~39-41? Kft) mapping NAM structure, downwind of extreme convective events, through tropopause folds, etc.
   Stair step flight pattern should permit good remote-sensing measurements.

2. **Level flight** segments coordinated with the lower aircraft to provide remote-sensing support for addressing various science objectives.

3. **Level flight** segments over specific scenes (e.g., clear-sky) or coordinated with satellite overpasses, ground measurements, and/or lower aircraft for evaluation of remote-sensing retrievals.

- Comments/suggestions?

Flight Parameters and Patterns

- Passive remote sensors (RSP, airMSPI, SSFR, eMAS) need daylight
- Remote sensors (SSFR, BBIR, airMSPI, RSP) generally desire straight and level with pitch, roll within 5 deg
- airMSPI desires minimal pitch variations, ground speed ~ 207 m/s
- airMSPI, RSP (strongly) prefer orientation along principal plane
- airMSPI requires acquisition of discernible land targets for each flight (Utapao airfield would be fine)
- airMSPI wants to avoid complex topography, desires Case 1 waters
- airMSPI wants nose heat
- eMAS – for cloud retrievals avoid sun glint, desire water and dark vegetation
- In situ sensors, and to a lesser degree (BBIR) would like some dips to sample gradients and/or clouds – ascent/descent rates < 2000 ft/min (HU/PCRS)
- Harvard water vapor wants:
  - Multiple vertical samples at different locations
  - Level legs through tropopause, lowest water vapor, lowest temperature
- Harvard water vapor has interest in night flight
- Avoid precipitation during ascent/descent (close RSP door in clouds)
- HU/PCRS desires both north-south and east-west transects of TTL
- NOAA ozone, water vapor desires latitudinal transects (especially to far north)
- So far, all instruments can handle flights up to 8 hours
- On ground RSP needs connection to dry N2
- HU/PCRS wants Q-bay temp < 35 deg C

General Cloud and Aerosol Conditions Desired

- WAS, NOAA Ozone, water vapor desire some in-cloud sampling
- eMAS
  - clear sky, ocean (warm) and anvil (cold) scenes (for IR calibration)
  - avoid multilayer and severely heterogeneous clouds (for cloud retrievals)
  - Moderately thick (for microphysical retrievals)
  - Relatively homogeneous cirrus without low clouds (ice cloud retrieval)
  - Relatively overcast PBL (for water cloud retrievals)
- SSFR
  - Sandwich cloud run with multiple aircraft and/or ER-2 above/below TTL cirrus
- (airMSPI, RSP, SSFR, eMAS) – for aerosol retrieval testing, desire cloud-free skies
- Thin cirrus of interest for many sensors
- Wide variety of aerosol loading conditions and types desired
- NOAA ozone wants to avoid very high aerosol to prevent contamination of instrument

Coincident Data Desired

- DC-8
  - Trace gas, water vapor measurements
  - Radiometers, AATS14, DIAL/HSRL for characterizing radiation, irradiance, surface reflectance, aerosol/cloud amounts
  - In situ aerosol/cloud measurements to provide correlative data for aerosol/cloud retrievals
- Satellites
  - MODIS, MISR, CALIPSO, PARASOL, VIIRS, AURA, AIRS, CrIS, IASI, CLOUDSAT, MLS, MTSAT-2
- Surface
  - AERONET, MPL
  - Ozonesondes, frostpoint sondes for intercomparisons
  - Surface radiation (Singapore, Vietnam)
  - Yokelson mobile FTIR for fire conditions

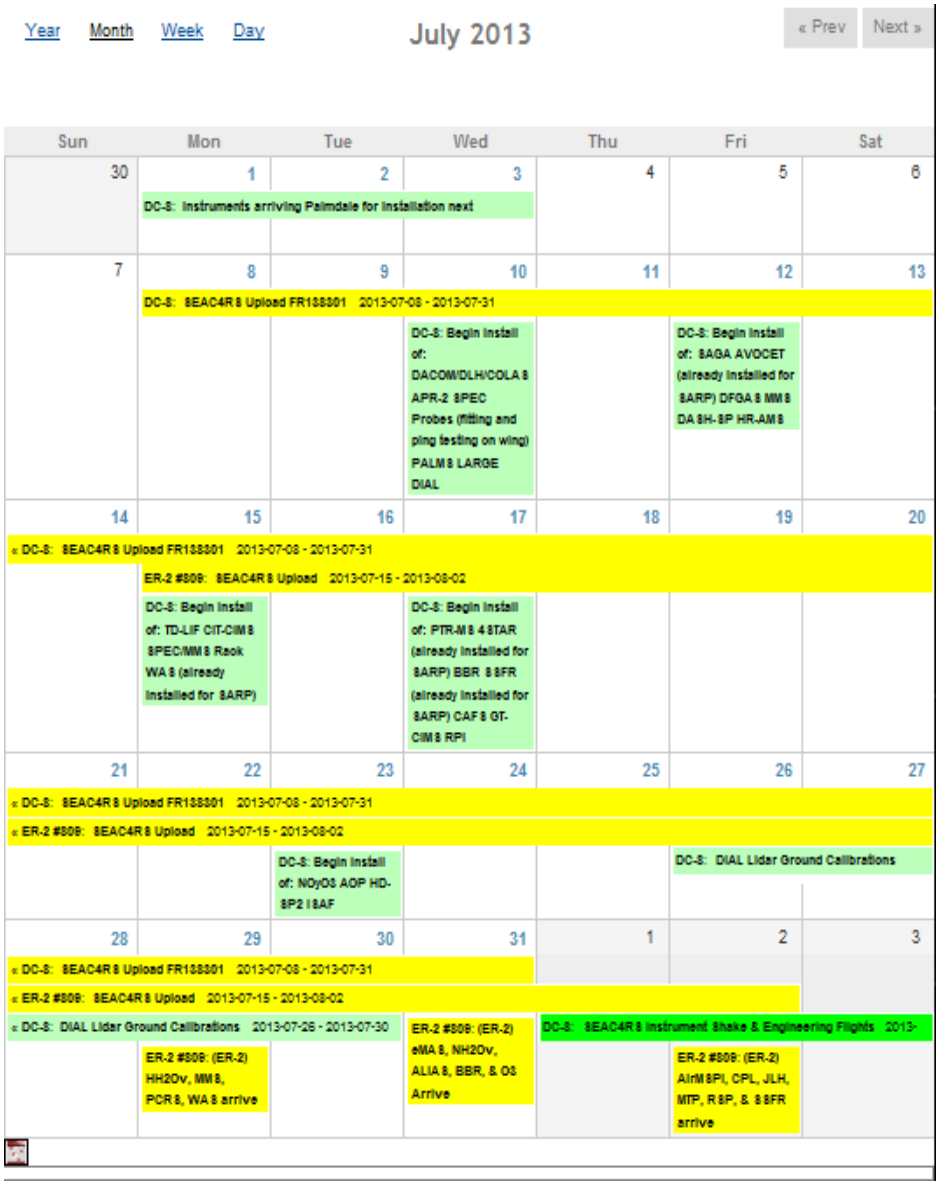
Real-time Data Download

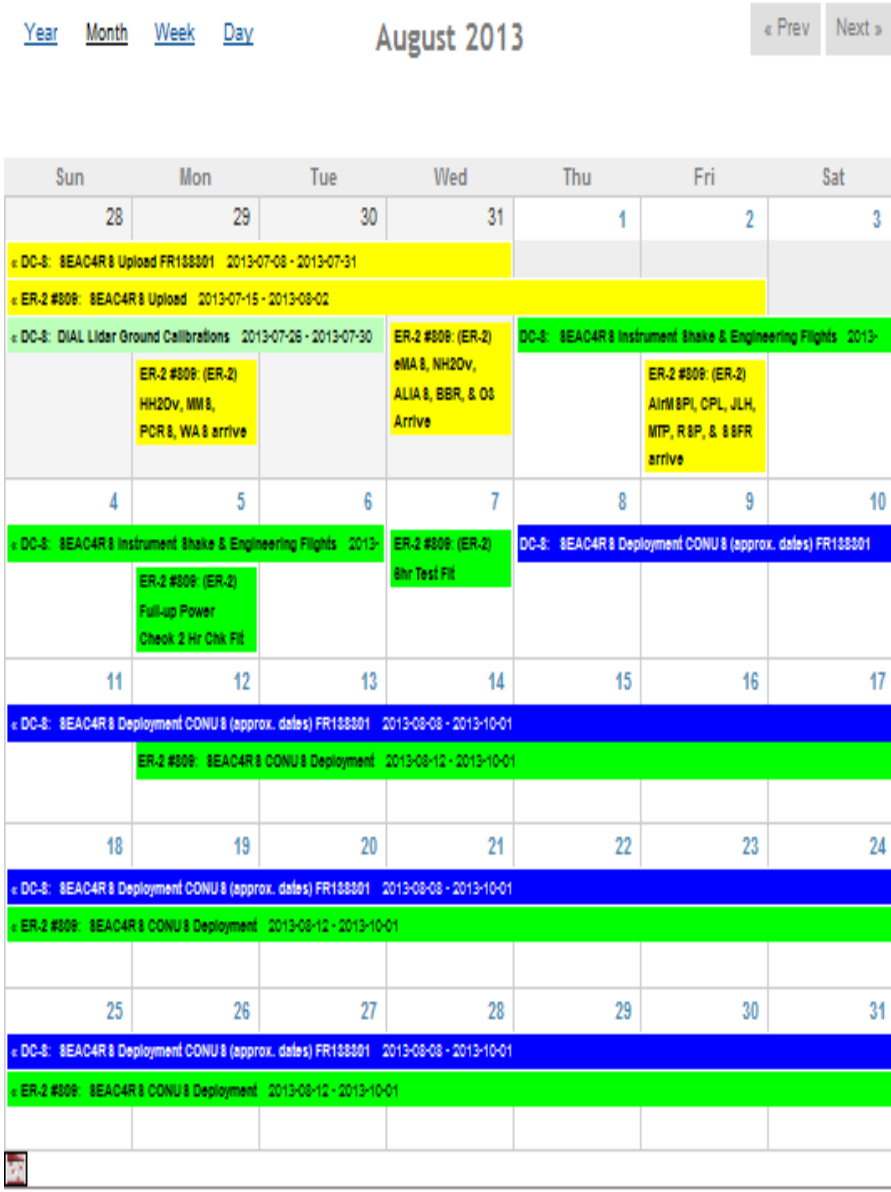
Instrument	Data type	Data downlink before?	Why needed?	Does Pi plan to downlink?
CPL	Lidar, clouds and aerosols	Yes, TC4	To detect clouds	Yes
MTP	Temperature profile	Yes, ATTREX	To locate tropopause	Yes (if 9600 baud RS232 Nav data available)
Ozone	Ozone, water vapor	Yes, ATTREX	Locate gradients	Yes
JLH	Water vapor	Yes, ATTREX	Locate gradients	Yes

Carl Sorenson - That's right, I will be integrating the new NASDAT to the ER-2 for SEAC4RS and doing the configuration; also coordinating the ground segment data handling. I'll likely be in the field for the first 3 weeks or so to make sure everything works out. There's a lot of other work going on this year, **so sooner is better than later if PIs want to provide status data to the ground or otherwise use Iridium satcom**. I plan to provide GH-like services on the ER-2 (and eventually on all the platforms).

Transit flights

- Three hops each way (e.g., DFRC−>Hawaii, Hawaii−>Korea, Korea−>Utapao)
- Lack of PI support for 2^{cnd} and 3rd flights
- Which instruments will be able to collect data?


Year Month Week Day
July 2013
« Prev Next »
Sun Mon Tue Wed Thu Fri Sat
30 1 2 3 4 5 6
DC-8: Instruments arriving Palmdale for installation next
7 8 9 10 11 12 13
DC-8: SEAC4RS Upload FR188801 2013-07-08 - 2013-07-31
DC-8: Begin install of: DACOM/DLH/COLA S APR-2 SPEC Probes (fitting and plng testing on wing) PALMS LARGE DIAL
DC-8: Begin install of: SAGA AVOCET (already installed for SARP) DFGA S MMS DA SH-SP HR-AMS
14 15 16 17 18 19 20
« DC-8: SEAC4RS Upload FR188801 2013-07-08 - 2013-07-31
ER-2 #809: SEAC4RS Upload 2013-07-15 - 2013-08-02
DC-8: Begin install of: TD-LIF CIT-CIMS SPEC/MMS Rack WAS (already installed for SARP)
DC-8: Begin install of: PTR-MS 4 STAR (already installed for SARP) BBR S SFR (already installed for SARP) CAFS GT-CIMS RPI
21 22 23 24 25 26 27
« DC-8: SEAC4RS Upload FR188801 2013-07-08 - 2013-07-31
« ER-2 #809: SEAC4RS Upload 2013-07-15 - 2013-08-02
DC-8: Begin install of: NOyOS AOP HD-SP2 ISAF
DC-8: DIAL Lidar Ground Calibrations
28 29 30 31 1 2 3
« DC-8: SEAC4RS Upload FR188801 2013-07-08 - 2013-07-31
« ER-2 #809: SEAC4RS Upload 2013-07-15 - 2013-08-02
« DC-8: DIAL Lidar Ground Calibrations 2013-07-26 - 2013-07-30
DC-8: SEAC4RS Instrument Shake & Engineering Flights 2013-
ER-2 #809: (ER-2) HH2Ov, MMS, PCRS, WAS arrive
ER-2 #809: (ER-2) eMAS, NH2Ov, ALIAS, BBR, & OS Arrive
ER-2 #809: (ER-2) AirMSPI, CPL, JLH, MTP, RSP, & SSFR arrive


Year Month Week Day
August 2013
« Prev Next »
Sun Mon Tue Wed Thu Fri Sat
28 29 30 31 1 2 3
« DC-8: SEAC4RS Upload FR188801 2013-07-08 - 2013-07-31
« ER-2 #809: SEAC4RS Upload 2013-07-15 - 2013-08-02
« DC-8: DIAL Lidar Ground Calibrations 2013-07-26 - 2013-07-30
ER-2 #809: (ER-2) HH2Ov, MMS, PCRS, WAS arrive
ER-2 #809: (ER-2) eMAS, NH2Ov, ALIAS, BBR, & OS Arrive
DC-8: SEAC4RS Instrument Shake & Engineering Flights 2013-
ER-2 #809: (ER-2) AirMSPI, CPL, JLH, MTP, RSP, & SSFR arrive
4 5 6 7 8 9 10
« DC-8: SEAC4RS Instrument Shake & Engineering Flights 2013-
ER-2 #809: (ER-2) Full-up Power Check 2 Hr Chk Flt
ER-2 #809: (ER-2) 8hr Test Flt
DC-8: SEAC4RS Deployment CONUS (approx. dates) FR188801
11 12 13 14 15 16 17
« DC-8: SEAC4RS Deployment CONUS (approx. dates) FR188801 2013-08-08 - 2013-10-01
ER-2 #809: SEAC4RS CONUS Deployment 2013-08-12 - 2013-10-01
18 19 20 21 22 23 24
« DC-8: SEAC4RS Deployment CONUS (approx. dates) FR188801 2013-08-08 - 2013-10-01
« ER-2 #809: SEAC4RS CONUS Deployment 2013-08-12 - 2013-10-01
25 26 27 28 29 30 31
« DC-8: SEAC4RS Deployment CONUS (approx. dates) FR188801 2013-08-08 - 2013-10-01
« ER-2 #809: SEAC4RS CONUS Deployment 2013-08-12 - 2013-10-01

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September 2013

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Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
« DC-8: 8EAC4R 8 Deployment CONU 8 (approx. dates) FR188801 2013-08-08 - 2013-10-01						
« ER-2 #809: 8EAC4R 8 CONU 8 Deployment 2013-08-12 - 2013-10-01						
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« DC-8: 8EAC4R 8 Deployment CONU 8 (approx. dates) FR188801 2013-08-08 - 2013-10-01						
« ER-2 #809: 8EAC4R 8 CONU 8 Deployment 2013-08-12 - 2013-10-01						
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« DC-8: 8EAC4R 8 Deployment CONU 8 (approx. dates) FR188801 2013-08-08 - 2013-10-01						
« ER-2 #809: 8EAC4R 8 CONU 8 Deployment 2013-08-12 - 2013-10-01						
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« DC-8: 8EAC4R 8 Deployment CONU 8 (approx. dates) FR188801 2013-08-08 - 2013-10-01						
« ER-2 #809: 8EAC4R 8 CONU 8 Deployment 2013-08-12 - 2013-10-01						
29	30	1	2	3	4	5
« DC-8: 8EAC4R 8 Deployment CONU 8 (approx. dates) FR188801			DC-8: 8EAC4R 8 Instrument Download FR188801 2013-10-02 -			
« ER-2 #809: 8EAC4R 8 CONU 8 Deployment 2013-08-12 - 2013-						

Year Month Week Day

October 2013

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Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	1	2	3	4	5
« DC-8: 8EAC4R 8 Deployment CONU 8 (approx. dates) FR188801			DC-8: 8EAC4R 8 Instrument Download FR188801 2013-10-02 -			
« ER-2 #809: 8EAC4R 8 CONU 8 Deployment 2013-08-12 - 2013-						
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2